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EXAMINER	
KIM, HEE-YONG	
ART UNIT	PAPER NUMBER
2482	
MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/585,443	BELLERS, ERWIN	
	Examiner	Art Unit	
	HEE-YONG KIM	2482	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 August 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This office action is in reply to Applicant's Response dated August 16, 2010.

2. **Claims 1-3, 5-9, and 11-12** have been amended.

3. **Claims 1-12** are still pending.

Response to Arguments

4. Rejection of **claims 1-12** under U.S.C. 101 is withdrawn because specification supports memory and microprocessor in Fig.3. Examiner interprets that independent claim 1 is done with microprocessor. Independent claim 7 is amended using microprocessor(s).

5. Applicant's arguments regarding claims 1-12 have been fully considered but they are not persuasive.

Regarding **claims 1-12**, applicant argues (pp.4-6) that Fan and Feng do not disclose measuring local motion complexity for a segment of frame. Examiner agrees that each of them do not disclose it, but maintains that combination of Fan and Feng teaches measuring local motion complexity for a segment of frame. Feng discloses measuring local motion complexity for a macroblock. Fan discloses advantage of doing segment based motion estimation (pp.1564-1565). Therefore, it was obvious to do measuring local motion complexity for a segment instead of macroblock, in order to do more efficient motion estimation (pp.1564, left col, paragraph 3).

Regarding claims **7-12**, Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. **Claims 7-12** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding **claim 7**, it recites " first microprocessor and second microprocessor". However, there is no disclosure about multi-microprocessor structure and it only discloses one microprocessor (Fig.3). Notice that Motion Estimation 350 and Video Processing Application are not processors, but parts of memory such as program in memory system 320. Therefore, it is a new matter.

Regarding **claims 8-12**, they are dependent on claim 7. Therefore, they are rejected too.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. **Claims 1-3, 6, 7-9,** and **12** are rejected as being unpatentable over Feng (Electronics Letters 31st August, 1995, pp.1542-1543) in view of Fan (Optical Eng. 37(5), pp.1563-1570).

Regarding **claim 1**, Feng discloses Adaptive Block Matching Motion Estimation Algorithm for Video Coding. Feng specifically discloses A method for distributing candidate motion vectors (Adaptive Block Matching Motion Estimation Algorithm for Video Coding, pp.1542-1543), the method comprising: dividing a picture frame into a plurality of pixel blocks (Block-based coding, pp.1542, Firs col., Introduction) using a first component of motion estimation (Examiner interprets it as Dividing function itself); measuring local motion complexity (Displaced Block Difference, Eq.1) for each pixel blocks using a second component of motion estimation (Examiner interprets it as measuring function itself); and

assigning a number of candidate motion vectors (Maximum displacement (motion search range determines the number of candidate vectors) to each motion class, pp.1542, second col., (ii) search range adaptation) to pixel blocks based on the measured local motion complexity (Three Motion classes - High, medium, low motion,

depending on DBD, pp. 1542, second col., (ii) search range adaptation) using a third component of motion estimation (Examiner interprets it as Assigning function itself). However, Feng fails to disclose dividing a picture frame into a plurality of *segments*, each segment comprising a plurality of pixel blocks; measuring local motion complexity for each *segment*; assigning a number of candidate motion vectors to pixel blocks within each segment based on the measured local motion complexity.

In the same field of endeavor, Fan discloses Efficient Motion Estimation Algorithm Based on Structure Segmentation and Compensability Analysis. Fan specifically discloses dividing a picture frame into a plurality of segments, each segment comprising a plurality of pixel blocks (Structure Segmentation, pp.1564-1565, Structure could be a background, moving object, uncovered background, edges), in order to do more efficient motion estimation based on structure segmentation (pp.1564, left col, 3rd paragraph).

Therefore, given this teaching, it would have been obvious to modify Feng by providing *dividing a picture frame into a plurality of segments, each segment comprising a plurality of pixel blocks*; measuring DBD for each segment by summing up block DBD's in a segment; assigning a search window (*number of candidate motion vectors*) to pixel blocks within each segment based on the measured segment DBD (*local motion complexity*), in order to do more efficient motion estimation based on structure segmentation. The Feng method, incorporating the Fan Structure Segmentation, further incorporating assigning the same search area (*number of candidate motion vectors*) to

pixel blocks within each segment based on segment DBD, discloses all the features of claim 1.

Regarding **claim 2**, the Feng method, incorporating the Fan Structure Segmentation, further incorporating assigning the same search window to pixel blocks within each segment based on segment DBD, as applied to claim 1, discloses wherein the step of measuring comprises:

determining a sum-of-absolute differences (Feng: Mean Absolute Difference, pp.1542, Equation 1) between pixel blocks of the picture frame (Feng: block being predicted by motion estimation in the present frame, pp.1542, paragraph after Eq.1), and corresponding pixel blocks of an adjacent frame (Feng: Candidate block within search area in the previous frame, pp.1542, paragraph after Eq.1), and

summing the measured sum-of-absolute differences (Feng: Equation 1) associated with of pixel blocks within each segment (Fan: Structure segmentation, pp.1564-1565).

Regarding **claim 3**, the Feng method, incorporating the Fan Structure Segmentation, further incorporating assigning the same search area to pixel blocks within each segment based on segment DBD, as applied to claim 1, discloses *wherein the step of assigning*

comprises using a distribution function (Examiner interprets as distributing the number of motion vectors according to Feng: pp.1542, second col., (ii) search range adaptation) *configured to assign the number of candidate vectors* (Feng: Maximum displacement (motion search range determines the number of candidate vectors) to each motion class, pp.1542, second col., (ii) search range adaptation) *based on the measured local*

motion complexity (Feng: Three Motion classes - High, medium, low motion, depending on DBD, pp. 1542, second col., (ii) search range adaptation) *of each segment* (Fan: Structure segmentation, pp.1564-1565).

Regarding **claim 6**, it is inherent in the Feng method, incorporating the Fan Structure Segmentation, further incorporating assigning the same search area to pixel blocks within each segment based on segment DBD, as applied to claim 1, *further comprising performing motion estimation on the pixel blocks using the number of candidate vectors assigned to each pixel block*, because motion vector candidates in the search range (Feng: Maximum displacement (motion search range) to each motion class, pp.1542, second col., (ii) search range adaptation) will be tried to get the best matching block.

Regarding **claim 7**, the claimed invention is a system claim corresponding to the method claim 1. Therefore, it is rejected for the same reason as claim 1.

Regarding **claim 8**, the claimed invention is a system claim corresponding to the method claim 2. Therefore, it is rejected for the same reason as claim 2.

Regarding **claim 9**, the claimed invention is a system claim corresponding to the method claim 3. Therefore, it is rejected for the same reason as claim 3.

Regarding **claim 12**, the claimed invention is a system claim corresponding to the method claim 6. Therefore, it is rejected for the same reason as claim 6.

10. **Claims 4 and 5** are rejected as being unpatentable over Feng in view of Fan and further in view of Cohen (US 5,355,221) (hereafter referenced as Cohen).

Regarding **claim 4**, Feng and Fan discloses everything claimed as applied above (see claim 3). However, Feng and Fan fail to disclose wherein the distribution function is based on a maximum, minimum and average of the measured sum-of-absolute differences of the segments.

In the different field of endeavor, Cohen discloses Rough Surface Profiler and Method. Cohen specifically discloses quadratic fitting (pp.13, Equation 8) using 3 points, in order to interpolate any points in general (col.13, line 1-8).

Therefore, given this teaching, it would have been obvious to modify Feng and Fen by providing the quadratic function fitting to the distribution function based on the measured sum-of-absolute differences of the segments, in order to interpolate distribution function based on sum-of-absolute differences. However, Cohen fails to disclose that these 3 points are *maximum, minimum and average*. However, it would have been obvious to choose *maximum, minimum and average,* in order to do better fitting of the quadratic function model based on a wide range of points.

Therefore, given this teaching, it would have been obvious to modify Feng and Fen by providing wherein the distribution function is based on a maximum, minimum and average of the measured sum-of-absolute differences of the segments, in order to do better fitting of the quadratic function model based on a wide range of points. The Feng method, incorporating the Fan Structure Segmentation, further incorporating assigning the same search area to pixel blocks within each segment based on segment DBD, further incorporating the Cohen quadratic fitting using 3 points (maximum, minimum, and average), discloses all the features of claim 4.

Regarding **claim 5**, Feng and Fan and Cohen discloses everything claimed as applied above (see claim 4). However, Feng and Fan and Cohen fail to disclose wherein the distribution function is further based on **predetermined values** for a maximum, minimum and average number of candidate vectors per block.

Cohen discloses that three coefficients for quadratic fitting are solved by 3 points (col.13, line 1-8). Cohen uses measured function values for these 3 points. However, they could be substituted by pre-determined values (some desired values for motion search range) too, in order to accommodate the real-time or hardware constraints of motion search range, because it was well-known that motion estimation is the most computational heavy operation.

Therefore, given this teaching, it would have been obvious to modify Feng and Fen and Cohen by providing wherein the distribution function is further based on predetermined values for a maximum, minimum and average number of candidate vectors per block, in order to accommodate the real-time or hardware constraints of motion search range. The Feng method, incorporating the Fan Structure Segmentation, further incorporating assigning the same search area to pixel blocks within each segment based on segment DBD, further incorporating the Cohen quadratic fitting using 3 points (maximum, minimum, and average), further incorporating using predetermined values for the above 3 points, discloses all the features of claim 5.

11. **Claims 7-9 and 12** are rejected as being unpatentable over Feng in view of Fan, and further in view of De Lange (US 5,959,689).

Regarding **claim 7**, the claimed invention is a system claim corresponding to the method claim which was discloses by Feng and Fen. However, Feng and Fan fail to disclose first and second microprocessors.

In the similar field of endeavor, De Lange discloses Multi-Media Processor Architecture with High Performance-Density. De Lange specifically discloses multi-processor coder (Fig.1) with first microprocessor (master processor 102, Fig.1) and second microprocessor (parallel processor 104, Fig.1), in order to do real time processing (col.1, line 21-27).

Therefore, given this teaching, it would have been obvious to modify Feng and Fan by providing specifically a first processor to *divide a picture frame into a plurality of segments and a second processor to assign a number of candidate motion vectors to pixel blocks within segment* , in order to do real time processing. The Feng system, incorporating the Fan Structure Segmentation, further incorporating assigning the same search area (*number of candidate motion vectors*) to pixel blocks within each segment based on segment DBD, further incorporating the De Lange Multi-processors discloses all the features of claim 7.

Regarding **claim 8**, the claimed invention is a system claim corresponding to the method claim 2. Therefore, Feng and Fan and De Lange teaches claim 8.

Regarding **claim 9**, the claimed invention is a system claim corresponding to the method claim 3. Therefore, Feng and Fan and De Lange teaches claim 8.

Regarding **claim 12**, the claimed invention is a system claim corresponding to the method claim 6. Therefore, Feng and Fan and De Lange teaches claim 8.

12. **Claims 10-11** are rejected as being unpatentable over Feng in view of Fan, further in view of Cohen, and further in view of De Lange.

Regarding **claim 10**, the claimed invention is a system claim corresponding to the method claim 4. Therefore, Feng and Fan and Cohen and De Lange teaches claim 10.

Regarding **claim 11**, the claimed invention is a system claim corresponding to the method claim 5. Therefore, Feng and Fan and Cohen and De Lange teaches claim 11.

Conclusion

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

1. Any inquiry concerning this communication or earlier communications from the examiner should be directed to HEE-YONG KIM whose telephone number is (571)270-3669. The examiner can normally be reached on Monday-Thursday, 8:00am-5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marsha Banks-Harold can be reached on 571-272-7905. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/HEE-YONG KIM/
Examiner, Art Unit 2621

/Andy S. Rao/
Primary Examiner, Art Unit 2482
October 21, 2010